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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,144	08/16/2001	Ronald Patrick Huemoller	W2K1057	3150

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EXAMINER

NORRIS, JEREMY C

ART UNIT PAPER NUMBER

2827

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/931,144	HUEMOELLER ET AL.	
	Examiner	Art Unit	
	Jeremy C. Norris	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 21-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7,9,12 and 21-27 is/are rejected.
- 7) ☒ Claim(s) 4,8,10 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 18 March 2003 is: a) ☐ approved b) ☒ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 18 March 2003, have been disapproved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

The drawings are objected to because the sectional views are not properly cross-hatched (see MPEP 608.02). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,371,654, granted to Beaman et al. (hereafter Beaman).

Beaman discloses, referring to figure 1, an integrated circuit comprising a substrate (12), having top channels for addition of circuit material (18, 60), the top channels having sides extending to a plane defining a top surface of the substrate and a bottom beneath the plane; a die (36) mounted to the substrate; a plurality of electrical terminals (20) mounted to the substrate for connecting the die to external circuits; and

circuit material deposited within the channels for forming an electrical connection between the die and the electrical terminals [claim 21], wherein the substrate further has bottom channels having sides extending to a bottom plane defining a bottom surface of the substrate and a top beneath the top surface, and wherein the circuit material (32) is further deposited within the bottom channels [claim 22]

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5-7, 9, 12, and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beaman, in view of US 4,996,391, granted to Schmidt (hereafter Schmidt).

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Beaman discloses, referring to figure 1, a substrate (12), having top channels for addition of circuit material (18, 60), the top channels having sides extending to a plane defining a top surface of the substrate and a bottom beneath the plane; a die (36) mounted to the substrate; a plurality of electrical terminals (20) mounted to the substrate for connecting the die to external circuits; and circuit material deposited within the channels for forming an electrical connection between the die and the electrical terminals. Beaman does not specifically disclose that the substrate is injection molded [claims 1, 12]. However, it is well known in the art that substrates can be formed by a variety of methods, including injection molding as evidenced by Schmidt (see col. 2, lines 60-65). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to injection mold the substrate as is well known in the art and evidenced by Schmidt. The motivation for doing so would have been to use a known technique that would not require exotic tooling. Moreover, the injection molding of the substrate is a process limitation in a product claim and it is well settled that the presence of process limitations in product claims, which product does not otherwise distinguish over the prior art, cannot impart patentability to that product. (*In re Thorpe*, 227 USPQ 964, 966).

Additionally, the modified invention of Beaman discloses that the substrate further has bottom channels having sides extending to a bottom plane defining a bottom surface of the substrate and a top beneath the top surface, and wherein the circuit material (32) is further deposited within the bottom channels [claim 2], wherein the circuit material connects circuit material within the top channels and circuit material

within the bottom channels through molded voids in the substrate [claim 3], further comprising another die (38), wherein the circuit material further forms electrical connections between the die and the other die [claim 5], wherein the substrate and the circuit material form die connection pads for solder ball (40) mounting of the die to the substrate [claim 6] wherein the circuit material further forms wire bond (46) pads for attaching wire bond connections from the die [claims 7, 9]

Regarding claims 23-24, Beamon discloses the claimed invention as described above with respect to claim 21 except Beaman does not specifically disclose that the substrate is injection molded [claim 23]. However, it is well known in the art that substrates can be formed by a variety of methods, including injection molding as evidenced by Schmidt (see col. 2, lines 60-65). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to injection mold the substrate as is well known in the art and evidenced by Schmidt. The motivation for doing so would have been to use a known technique that would not require exotic tooling. Moreover, the injection molding of the substrate is a process limitation in a product claim and it is well settled that the presence of process limitations in product claims, which product does not otherwise distinguish over the prior art, cannot impart patentability to that product. (*In re Thorpe*, 227 USPQ 964, 966).

Additionally, the modified invention of Beaman discloses that the circuit material connects circuit material within the top channels and circuit material within the bottom channels through molded voids in the substrate [claim 24], further comprising another die (38), wherein the circuit material further forms electrical connections

between the die and the other die [claim 25], wherein the substrate and the circuit material form die connection pads for solder ball (40) mounting of the die to the substrate [claim 26] wherein the circuit material further forms wire bond (46) pads for attaching wire bond connections from the die [claim 27].

Response to Arguments

Applicant's arguments filed 18 March 2003 have been fully considered but they are not persuasive. Applicants argue that the invention discloses in Beaman reference, with respect to Figure 1, described above was not intended to describe a substrate having channels and further that the invention of Beaman does not include such channels. In defense of this position, Applicants contend that Figure 1 does not disclose the detail of the substrate and suggest that Figure 2 is more representative of the proper orientations. Moreover, Applicants allege that the recitation in Beaman "multilevel wiring structure 12 contains at least one layer of electrical conductors 14 such as copper aluminum or gold and has on surface 16 a plurality of contact locations 18", is a positive declaration that the invention of Beaman does not have the conductors embedded within the substrate.

Examiner first would like to note that MPEP § 2125 clearly states that drawings can anticipate claimed features and that "it does not matter that the feature shown is unintended or unexplained in the specification". Therefore, it is Examiner's position that Applicants' traversal on these grounds is moot. However, Examiner will further address Applicants' specific points.

It is the position of the Examiner that Figure 1 is more representative of the detail of the substrate of the invention of Beaman. With Figure 1 being a dedicated cross sectional view and Figure 2 being a partially cut-away perspective view, one of ordinary skill in the art would look to the sectional view to determine the relationship between the conductors and the surface of the substrate. Moreover, despite Applicants' claims to the contrary, one of ordinary skill in the art would not interpret from Figure 2 that "conductors 18 are clearly shown as overhanging the edges of the dielectric, illustrating that the conductor is in fact, located above the surface". After a thorough inspection of the figure, Examiner finds no basis for Applicants' allegation that would be apparent to one of ordinary skill in the art. However, Examiner notes that an artisan of ordinary skill would indeed interpret Figure 1 as disclosing that the conductors 18 are embedded within a trench in the substrate 12.

Additionally, Applicants argue that "Figure 6, reveals a multilayer interconnect having a proper view of conductor 92 above dielectric 105". While not necessarily agree with Applicants, Examiner contends that Figure 6 is an alternate embodiment from that shown in Figure 1 and thus moot. Moreover, Beaman discloses a further embodiment in Figure 8, which shows the conductors 127 disposed within trenches of a grid projection pattern 125 of the substrate 121 (see col. 7, lines 60-65). Therefore, even assuming *en arguendo* that Figure 6 is a proper representation of the substrate in Figure 1, one of ordinary skill in the art could only conclude that Figure 8 is *also* a proper representation of the substrate in Figure 1 and thus the feature in question is still shown.

Regarding the application of the Schmidt reference towards the instantly claimed invention, Applicants provided no further arguments. Instead, Applicants rely on their arguments regarding the Beaman reference. Since Examiner has already addressed those arguments above, Examiner submits that all of Applicants argument have been addressed. Therefore, the traversal of the above rejected claims is deemed unsuccessful.

Allowable Subject Matter

Claims 4, 8, 10, and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claim 4 states the limitation "wherein said voids have a conical shape to promote plating growth through said voids". This limitation, in conjunction with the other claimed limitations was neither found to be disclosed in, nor suggested by the prior art. Claim 8 states the limitation "further comprising a solderable plating layer deposited over the circuit material for preventing oxidation of the circuit material. This limitation, in conjunction with the other claimed limitations was neither found to be disclosed in, nor suggested by the prior art. Claim 10 states the limitation "wherein the substrate includes a well for mounting the die". This limitation, in conjunction with the other claimed limitations was neither found to be disclosed in, nor suggested by the prior art. Claim 11 states the limitation "further comprising a conductive sheet on the bottom of

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the substrate". This limitation, in conjunction with the other claimed limitations was neither found to be disclosed in, nor suggested by the prior art.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy C. Norris whose telephone number is 703-306-5737. The examiner can normally be reached on Mon.-Th., 9AM - 6:30 PM and alt. Fri. 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-0725 for regular communications and 703-308-0725 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JCSN
July 26, 2003



DAVID L. TALBOTT
SUPERVISORY PATENT EXAMINER
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